

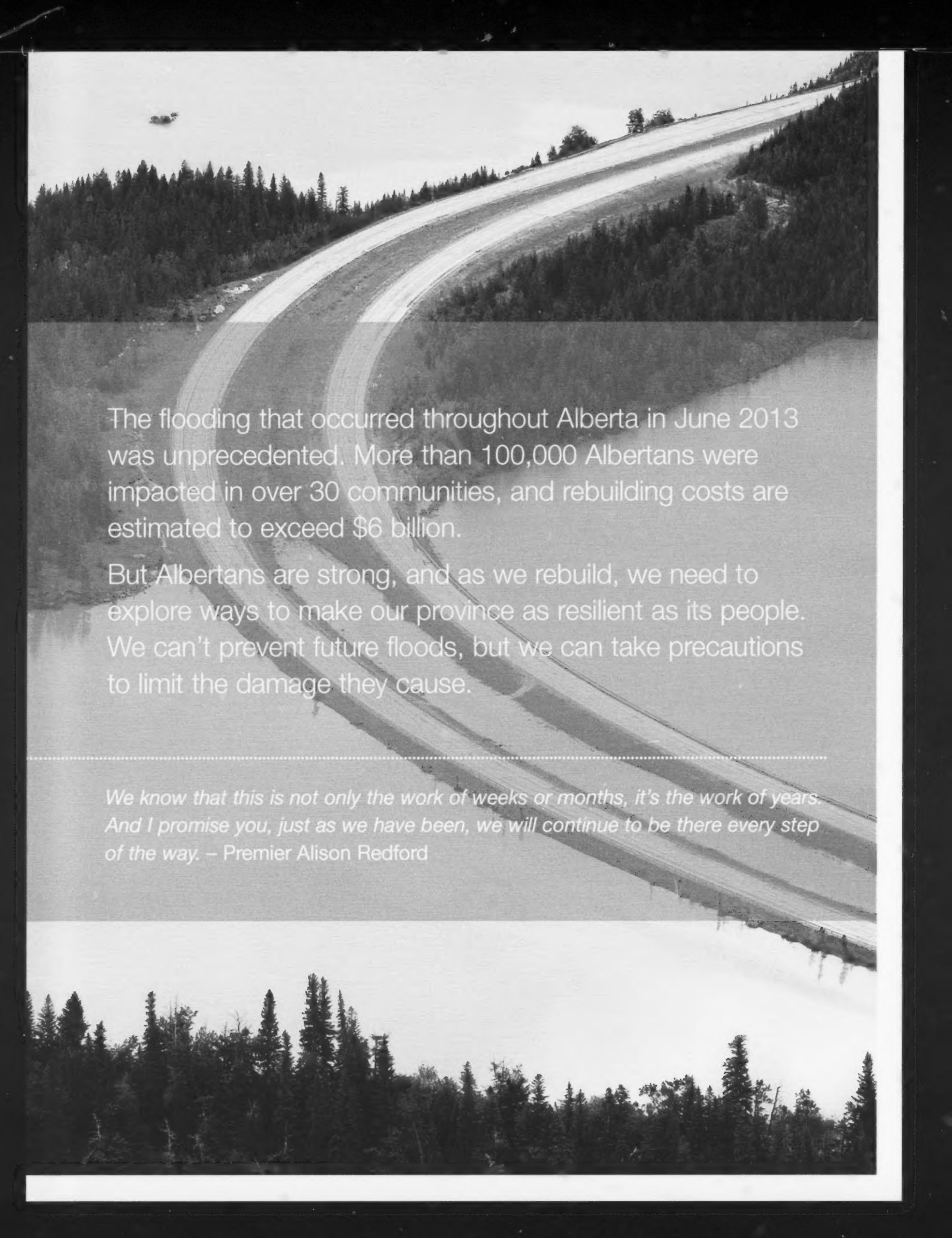


Respecting Our Rivers

ALBERTA'S APPROACH TO FLOOD MITIGATION

Alberta
Government

 The
Building
Alberta
Plan



The flooding that occurred throughout Alberta in June 2013 was unprecedented. More than 100,000 Albertans were impacted in over 30 communities, and rebuilding costs are estimated to exceed \$6 billion.

But Albertans are strong, and as we rebuild, we need to explore ways to make our province as resilient as its people. We can't prevent future floods, but we can take precautions to limit the damage they cause.

We know that this is not only the work of weeks or months, it's the work of years. And I promise you, just as we have been, we will continue to be there every step of the way. – Premier Alison Redford

Through various mitigation efforts, we can provide layers of resiliency against flooding, reduce negative downstream impacts and bring together projects at the regional and local levels.

Seven key elements will guide our approach to mitigation: watershed management, flood modelling and warning systems, risk management policies, water management and mitigation infrastructure, erosion control, local initiatives, and individual initiatives.

Watershed

Or drainage basin, is an area of land that captures surface water and funnels it to a single point at a lower elevation. They are complex, natural systems, and Alberta has a number of them. When a watershed experiences an increase of water in its system – often due to excessive rain or snow melt – water levels throughout it can rise. If overwhelmed by excessive water, flooding may occur.

One per cent flood

A flood that has a one per cent chance of occurring or being exceeded each year.

1 OVERALL WATERSHED MANAGEMENT

Albertans asked us to take a big-picture view of flood mitigation. To do this properly, it's important to understand how water flows in a region. Where does water drain and where it is held? How do interconnected drainage points ultimately feed into our rivers? The answers to these questions help us avoid mitigation projects that have negative impacts downstream and will influence future decisions on water and land use in the watershed.

Provincial actions

- Consult with Watershed Planning and Advisory Councils, irrigation districts and other stakeholders across the province
- Implement the Alberta Wetland Strategy to protect and maintain wetlands
- Maintain and manage healthy river systems in ways that minimize manmade impacts and allow rivers to sustain themselves

2 FLOOD MODELLING PREDICTION AND WARNING SYSTEMS

It's impossible to know what nature is going to do next – just ask any Albertan how quickly the weather can change – but there are ways to predict where water is going to go during a flood. By developing new models of water flow, we are building the most reliable flood hazard studies and maps possible. When complete, they will provide the necessary insight to better prepare for future floods.

Provincial actions

- Invest more than \$8.5 million to update flood hazard mapping
- Accelerate mapping of new areas and high risk communities
- Develop a system to model future floods

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FLOOD RISK MANAGEMENT POLICIES

Flood Hazard Area

The total area flooded by a one per cent flood. It is usually divided into floodway and flood fringe zones.

Floodway Zone

The portion of the flood hazard area where flows are deepest, fastest and most destructive. New provincial legislation prohibits further development in these areas, and those who live within them are being provided with assistance to relocate.

Flood Fringe Zone

Floodwater in the flood fringe is generally shallower and flows more slowly than in the floodway. It is safe to live in the fringe and new development is permitted. However, home owners should take precautions and put mitigation measures in place.

We will never be able to completely eliminate the flood risk faced by some communities, but we can take steps to manage it. Part of this is accepting that sometimes it's more practical to keep people away from water, rather than trying to keep water away from people.

This fall, the Redford Government introduced legislation to limit future development in floodways and rolled out a plan to help families relocate out of the most at-risk areas if they so choose. We've also updated building codes and engineering requirements in flood fringe zones. These are some of the simple, common-sense solutions that Albertans asked for.

Provincial actions

- Introduce a relocation program for homes in the most flood-prone areas
- Introduce legislation to prohibit development in floodways

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WATER MANAGEMENT AND MITIGATION INFRASTRUCTURE

Infrastructure will play an important part in providing layers of resiliency against floods. Dikes, berms, dams and diversions can reduce the flow of water during flood conditions. However, these are large, complex engineering projects that take time to design and build properly.

Our commitment to Albertans is to provide flood mitigation solutions that make sense. This means moving forward with the best solutions, not merely the fastest ones. Albertans can be confident that when new flood mitigation infrastructure is approved, it is done so only after we have studied the impact it will have on water management in the region, consulted impacted communities and conducted a thorough environmental impact assessment.

Provincial actions

- Begin High River diversion canal project in 2014
- Develop comprehensive engineering reports for the Bow, Elbow, Highwood, South Saskatchewan and Sheep rivers
- Conduct necessary consultations
- Accelerate approvals for viable upstream mitigation infrastructure following engineering studies

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EROSION CONTROL

Flood Facts

- The Highwood River reached a preliminary peak flow of $754\text{m}^3/\text{s}$ below Little Bow Canal – ten times its June average – before the gauge was washed away.
- More than 22 Olympic-sized swimming pools of material have been scraped to re-establish the safe flow of the Highwood River.

Rivers don't just flow higher during a flood; they flow harder, faster and carry more debris. This causes erosion, which weakens the stability of a riverbank and can damage homes, infrastructure and the environment.

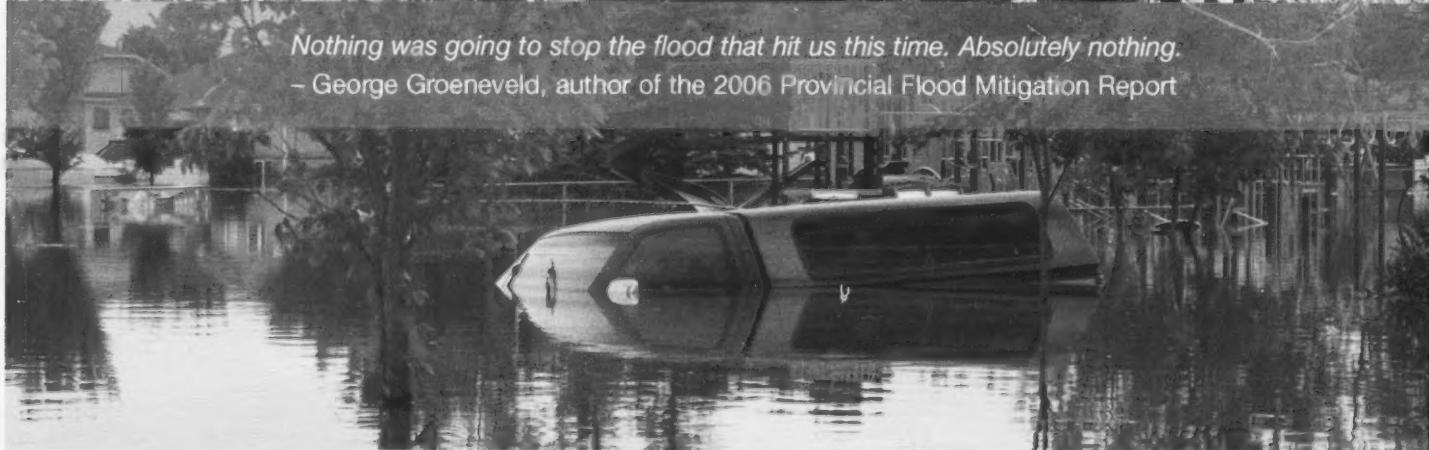
To defend against this, we're undertaking erosion control projects to repair and reinforce Alberta's most susceptible riverbanks. Investing in erosion control today makes our rivers more durable—ensuring water flows within natural channels in the future—and protects important infrastructure such as highways and bridges during floods.

Provincial actions

- Invest more than \$110 million for erosion control projects
- Begin work on projects in Calgary, Medicine Hat, Canmore, High River, the Municipal District of Bighorn, Rocky View County and Mountain View County, with many more projects in final review
- Ensure all major erosion control projects are completed by the end of 2015 and continue to proactively manage erosion across the province



Nothing was going to stop the flood that hit us this time. Absolutely nothing.
 – George Groeneveld, author of the 2006 Provincial Flood Mitigation Report



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LOCAL MITIGATION INITIATIVES BY MUNICIPALITIES

All levels of leadership need to be involved when preparing for future floods. Through consultation and partnerships, we're empowering local authorities in flood-hazard areas to make the right decisions regarding mitigation efforts. By reassessing future development, considering local engineering projects and raising public awareness of flood precautions, municipalities are able to address mitigation in ways that best suit their individual needs.

Flood Facts

- 100,000 Albertans were affected by the floods in 30 communities.
- 55,000 km² of the province was impacted.
- 32 local governments declared local states of emergency, and the flood resulted in Alberta declaring its first ever State of Provincial Emergency.
- Around Canmore, more than 220mm of rain fell in just 36 hours, nearly half of the town's annual average rainfall.
- In the Highwood River basin, rainfall amounts at one weather station recorded 325mm in less than 48 hours.

Provincial actions

- Consult with municipalities on local mitigation
- Provide a Municipal Recovery Toolkit to help guide communities with rebuilding
- Implement robust emergency management plans throughout Alberta communities

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INDIVIDUAL MITIGATION MEASURES FOR HOMES

Flood protection for your family starts at home. There are a few simple steps you can take to make your home flood resilient. Basements should be properly sealed from the elements and refinished with materials that resist water damage. Electrical panels that are located below ground should be shielded or moved, and plumbing should be protected from sewer backups.

We are working hard to reduce the risk of future flooding in Alberta, but this risk will never be completely eliminated. It's important that Albertans living in flood-prone areas are prepared.

Provincial actions

- Update flood mitigation building codes for homes in flood fringes
- Update flood mitigation repair codes
- Ensure Disaster Recovery Program funding is available to assist with individual mitigation

FLOOD MITIGATION TIMELINE

Immediate (Fall 2013 – Spring 2014)

- Erosion control begins
- Relocation of homes in floodway
- Flood legislation introduced
- Municipal mitigation efforts begin, including dikes and rivers
- Accelerate engineering and environmental review of pilot dam upstream of Elbow River
- Feasibility and engineering studies of large mitigation projects, including Bow River
- Environmental review begins
- Updates to flood hazard maps begin
- Release the Municipal Recovery Toolkit
- Update flood mitigation building codes

Short Term (Spring 2014 – Spring 2015)

- Highwood River diversion project begins
- Complete municipal mitigation projects
- Decide on and implement Bow River mitigation
- Consultations on water management infrastructure begins
- Implement updated modeling and prediction systems

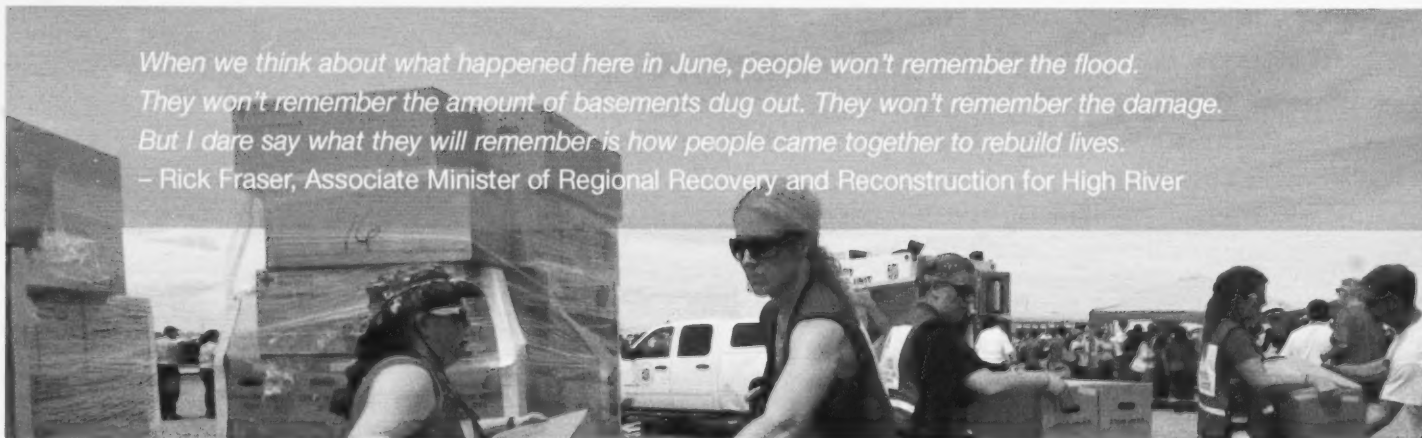
Medium Term (Spring 2015 – Fall 2016)

- Construction of water management infrastructure begins
- All erosion control projects complete
- Provincial flood-risk assessment complete
- Watershed management solutions implemented
- Protection of water and waste-water facilities complete
- Floodway policy solutions fully implemented
- Implement robust emergency management plans across municipalities

Long Term (Fall 2016 – Spring 2020)

- Long-term engineering solutions begin to be completed
- Municipal mitigation and resiliency plans completed

When we think about what happened here in June, people won't remember the flood. They won't remember the amount of basements dug out. They won't remember the damage. But I dare say what they will remember is how people came together to rebuild lives.
– Rick Fraser, Associate Minister of Regional Recovery and Reconstruction for High River



A black and white photograph of four people standing in front of a house that has been damaged by flooding. The house's roof and upper walls are visible, showing signs of water damage. The four individuals, three men and one woman, are dressed in casual clothing, some of which appears to be covered in mud or dirt. They are looking towards the camera with serious or neutral expressions.

THE FUTURE OF FLOOD MITIGATION IN ALBERTA

Rethinking how our province addresses flood events began before the June 2013 floods were over. We started with an assessment of what worked and – more importantly – what didn't. We spoke to people who could provide the most valuable insight.

Step one in Alberta's flood mitigation future was listening. In the weeks and months since the largest natural disaster in Canadian history, we heard from international experts and lifelong Albertans. We made note of lessons learned here at home, in other provinces, the United States and overseas.

We gathered ideas on flood mitigation, then stepped back so they could be challenged. The result is a new way of thinking about flood mitigation. It's the big-picture view that Albertans asked for; one that clearly connects the dots between nature and infrastructure, policy and common sense.

Albertans have already seen this plan in action. We're updating our flood hazard studies to identify areas at risk, introducing new rules to limit development in floodways and developing a plan to help Albertans move away from our province's most flood-prone areas. Riverbanks that were eroded due to high water and debris during the floods are being repaired and enhanced.

And we're just getting started. Other flood mitigation solutions will follow in the coming months and years. We'll consult Albertans, First Nations, municipalities, farmers, industry and other stakeholders. Together we'll find the best solutions to provide layers of resiliency against extreme weather events.

We are more focused, more committed than ever to implementing a flood mitigation plan that protects Alberta's people, infrastructure, economy and environment. This is just one of the many ways we're building Alberta.

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